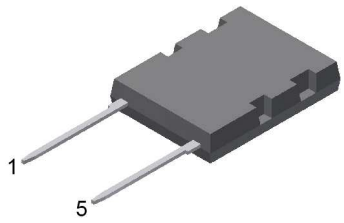
Sonic Fast Recovery Diode

V_{RRM} = 4500 V
I_{F80} = 43 A
t_{rr} = 1450 ns

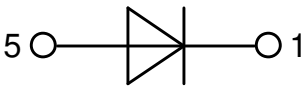
High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Single Diode

Part number

DHG40I4500KO



Backside: isolated
see important note page 4



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low Irm-values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low Irm reduces:
  - Power dissipation within the diode
  - Turn-on loss in the commutating switch

Applications:

- Antiparallel diode for high frequency switching devices
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

Package: ISOPLUS264

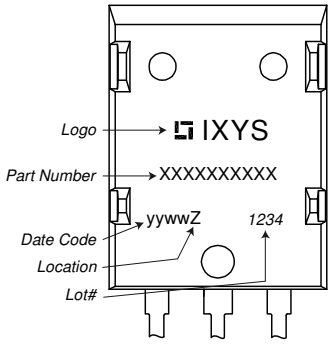
- Isolation Voltage: 4200 V~
- Industry convenient outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

Fast Diode

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			4500	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			4500	V
I_R	*reverse current, drain current*	V_R = 4500 V	T_{VJ} = 25°C			100	µA
		V_R = 4500 V	T_{VJ} = 125°C			2	mA
V_F	*forward voltage drop*	I_F = 50 A	T_{VJ} = 25°C			3.02	V
		I_F = 100 A				3.67	V
		I_F = 50 A	T_{VJ} = 125°C			3.33	V
		I_F = 100 A				4.35	V
I_{FAV}	*average forward current*	T_C = 80°C	T_{VJ} = 150°C			43	A
		rectangular d = 1.0					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			2.20	V
r_F	*slope resistance* }					24	mΩ
R_{thJC}	*thermal resistance junction to case*					0.5	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.15		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			250	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine; V_R = 0 V	T_{VJ} = 45°C			600	A
C_J	*junction capacitance*	V_R = 1800 V f = 1 MHz	T_{VJ} = 25°C		13		pF
I_{RM}	*max. reverse recovery current*		T_{VJ} = 25°C		80		A
		I_F = 50 A; V_R = 2800 V	T_{VJ} = 125°C		82		A
t_{rr}	*reverse recovery time*	$-di_F/dt$ = 800 A/µs	T_{VJ} = 25°C		1450		ns
			T_{VJ} = 125°C		2200		ns

Package ISOPLUS264				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal				70	A
T_{VJ}	*virtual junction temperature*			-40		150	°C
T_{op}	*operation temperature*			-40		125	°C
T_{stg}	*storage temperature*			-40		150	°C
Weight					10		g
F_C	*mounting force with clip*			20		120	N
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	13.8			mm
$d_{Spb/Apb}$			*terminal to backside*	5.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	4200			V
		t = 1 minute		3000			V

Product Marking



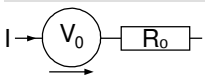
Part description

D = Diode
H = Sonic Fast Recovery Diode
G = extreme fast
40 = Current Rating [A]
I = Single Diode
4500 = Reverse Voltage [V]
KO = ISOPLUS264 (2HV)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DHG40I4500KO	DHG40I4500KO	Tube	25	520601

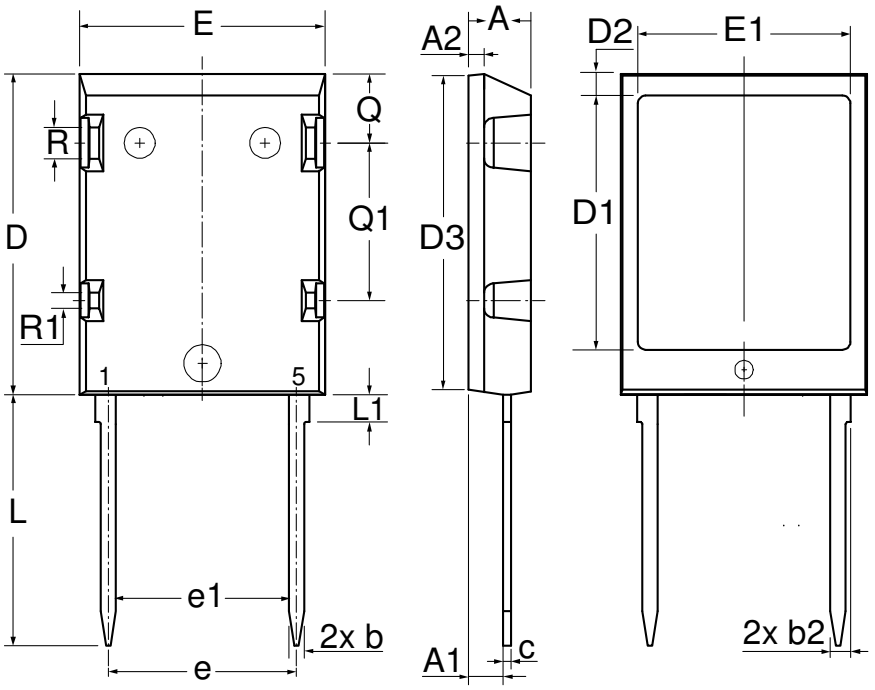
Equivalent Circuits for Simulation

** on die level* T_{VJ} = 150°C

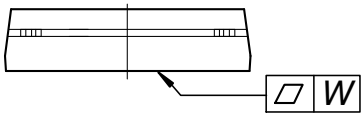


		Fast Diode	
$V_{0\ max}$	*threshold voltage*	2.2	V
$R_{0\ max}$	*slope resistance **	24	mΩ

Outlines ISOPLUS264



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.83	5.21	0.190	0.205
A1	2.59	3.00	0.102	0.118
A2	1.17	1.40	0.046	0.055
b	1.14	1.40	0.045	0.055
b2	1.60	1.83	0.063	0.072
c	0.51	0.74	0.020	0.029
D	25.91	26.42	1.020	1.040
D1	20.34	20.85	0.801	0.821
D2	1.65	2.03	0.065	0.080
D3	25.29	25.78	1.000	1.020
E	19.56	20.29	0.770	0.799
E1	16.97	17.53	0.668	0.690
e	15.24	BSC	0.600	BSC
e1	14.10	BSC	0.555	BSC
L	19.81	20.83	0.780	0.820
L1	2.03	2.59	0.080	0.102
Q	5.33	5.97	0.210	0.235
Q1	12.45	13.03	0.490	0.513
R	3.81	4.57	0.150	0.180
R1	2.54	3.30	0.100	0.130
W	-	0.10	-	0.004



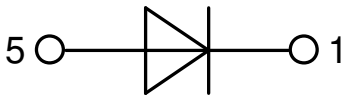
Die konvexe Form des Substrates ist typ. < 0.05 mm über der Kunststoffoberfläche der Bauteilunterseite

The convex bow of substrate is typ. < 0.05 mm over plastic surface level of device bottom side

Important note:

External clearances between pins and between pins and tab may be insufficient to prevent flash over under all conditions. It is the customer's responsibility to apply additional insulation appropriate to the application.
ISOPLUS264 is designed to isolate a max continuous operation voltage (DC) of 1700 V. The peak test voltage of 4200 V assures safety for transient voltages only. The package is not tested for partial discharge.
If the product is used outside the package design voltage range the customer must use additional electrical insulation. Extra insulation layers should be used both between the tab and any heatsink and between any conducting clip and the top surface of the package particularly when metal parts (such as a heatsink or a clip) are in contact. Please note that the intention of this package is to provide customers with an encapsulated die for high voltage application but the responsibility rests entirely with the customer to ensure for safe operation. Bodily injury cannot be excluded if this warning is disregarded. Device implementation is the end user's responsibility.

For a low FIT rate over lifetime failures due to SEB (Single Event Burnout) and an adequate voltage derating should be considered.



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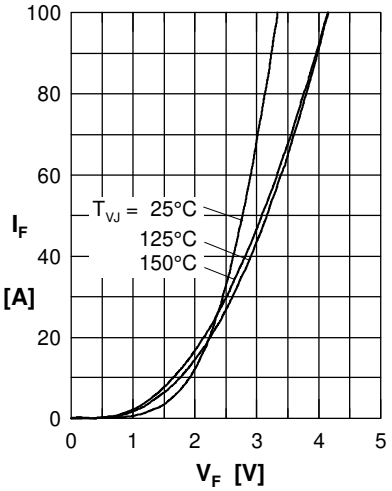

Fig. 1 Forward current I_F versus V_F

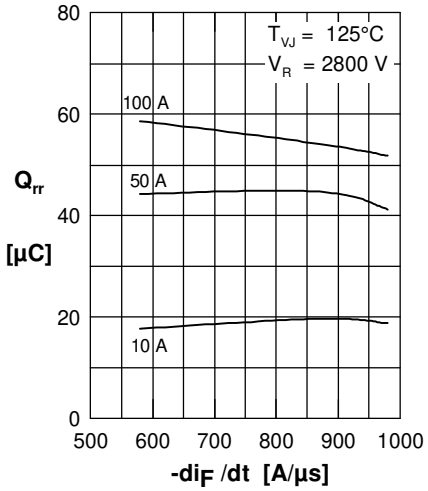

Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

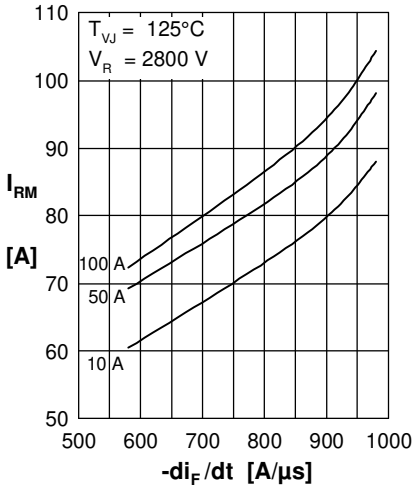

Fig. 3 Typ. reverse recov. current I_{RM} versus $-di_F/dt$

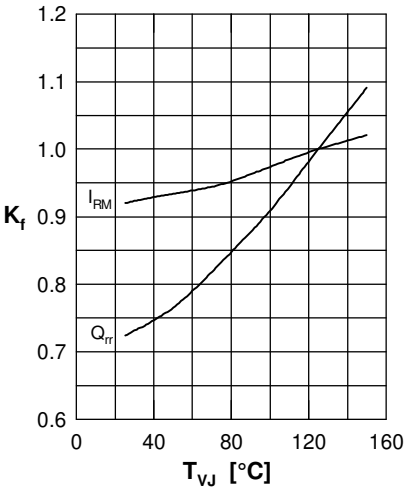

Fig. 4 Typ. dynamic parameters Q_{rr}, I_{RM} versus T_{VJ}

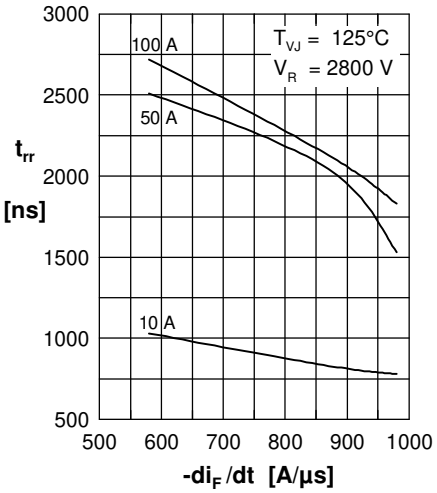

Fig. 5 Typ. reverse recov. time t_{rr} versus $-di_F/dt$

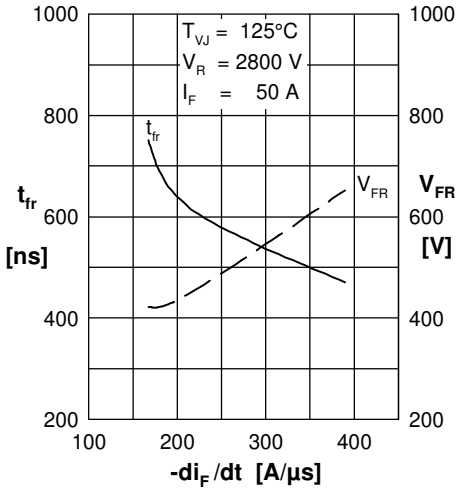

Fig. 6 Typ. forward recov. voltage V_{FR} & time t_{fr} versus di_F/dt

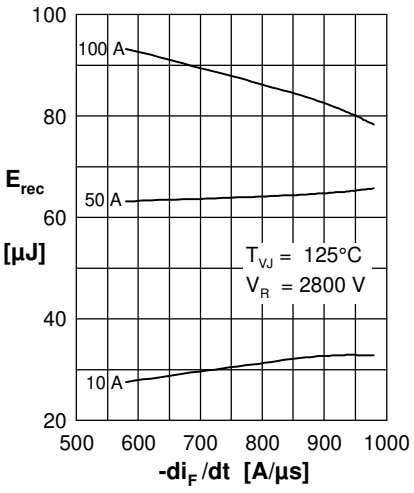

Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

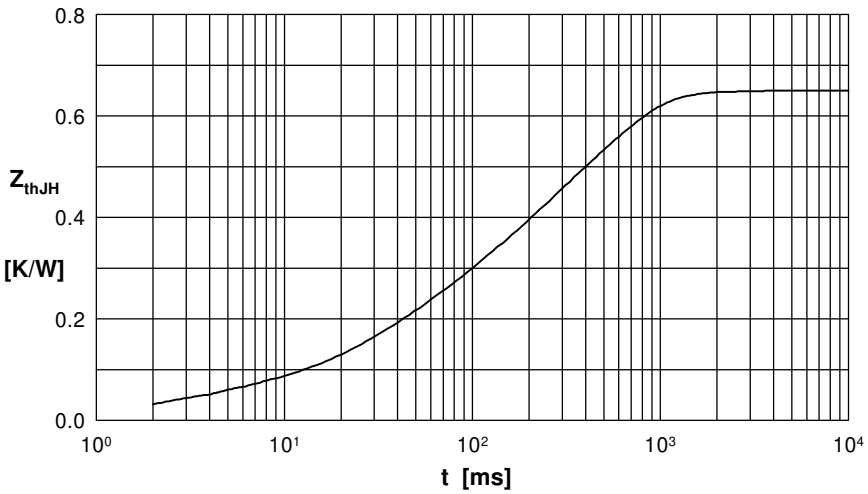

Fig. 8 Typical transient thermal impedance junction to heatsink